Statistic Test. ①

1) Anova

	Var 1	Var 2	Var 3
Sum of x	500	530	440

$N = 30$

$$C_x = \frac{\Sigma(x)^2}{N} = \frac{(500 + 530 + 440)^2}{30} = \frac{(1470)^2}{30}$$

$$= \frac{2160900}{30} = 72,030$$

Sum of Square.

$$S_{ST} = \Sigma x^2 - C_x = (26,742 + 28,586 + 20,422) - 72,030$$

$$SST = 3720$$

Sum of Squares among group:

$$SSA = \frac{(\Sigma x^2)}{n} - C_x$$

$$\left(\frac{(500)^2}{10} + \frac{(530)^2}{10} + \frac{(440)^2}{10} \right) - 72,030$$

A	B	C
729	3969	2704
1849	1849	3600
4096	2704	1369
3844	3364	1600
1936	2916	529
2916	2500	1521
3249	4225	3025
2401	2809	2704
9681	1849	1849
4761	2401	1521
Σx^2 ~~35,382~~ 26,742	28,586	20,422

$$\left(\frac{250,000}{10} + \frac{280,900}{10} + \frac{193600}{10}\right) - C_x$$

$$= 250,00 + 28090 + 19,360$$

$$= 72450 - 72,030$$

$$SSA = 420$$

Sum of Squares Within ③

$SS_W = SST - SSA$

$= 3720 - 420$

$SSW = 3300$

Mean of Sum of Squares among group:

$$M_{SSA} = \frac{SSA}{K-1} = \frac{420}{3-1} = \frac{420}{3} = 140$$

Mean of Sum of Squares Within

$$M_{SSW} = \frac{SSW}{N-K} = \frac{3300}{30-3} = \frac{3300}{27} = 122.22$$

F-Ratio : $\frac{MSSA}{M_{SSW}} = \frac{140}{122.22} = 1.14$

F tabl

$1.14 = 3.10$

2) Anlova for Stocks

F	E	U
10.76	12.72	11.88
15.05	13.91	5.86
17.01	6.43	13.46
5.07	11.99	9.9
19.5	18.79	3.95
8.16	20.73	3.44
10.38	9.6	7.11
6.75	17.4	15.7
Σx 92.68	110.77	71.3

Σx^2

115.77 ~~1,997.76~~	161.79	141.13
226.50	193.48	34.33
289.34	41.34	181.17
25.70	125.21	98.01
380.25	353.06	15.60
66.58	429.73	11.83
107.74	92.16	50.58
45.56	302.76	246.49
1,257.44	1699.53	779.11
8	8	8

$N = 24$ $k = 8$

$$C_x = \frac{\Sigma(x)^2}{N} = \frac{(92.68 + 110.77 + 71.3)^2}{24}$$ (5)

$$= \frac{75,487.56}{24} = 3,145.31$$

$$SS_T = \Sigma x^2 - C_x = (1,257.44 + 1699.53 + 779.11) - 3,145.31$$

$$= 3736.08 - 3,145.31$$

$$SS_T = 590.77$$

$$SS_A = \frac{(\Sigma x^2)}{n} - C_x$$

$$= \frac{(92.68)^2}{8} + \frac{(110.77)^2}{8} + \frac{(71.3)^2}{8} - 3,145.31$$

$$= (1073.69 + 1533.74 + 635.46)$$

$$= 97.58$$

$$SS_W = SS_T - SS_A \qquad (6)$$

$$= 590.77 - 97.58$$

$$= 493.19$$

$$M_{SSA} = \frac{SSA}{k-1} = \frac{97.58}{3-1} = \frac{97.58}{2} = 48.79$$

$$M_{SSW} = \frac{SSW}{N-k} = \frac{493.19}{24-3} = \frac{493.19}{21} = 23.48$$

$$F\ ratio = \frac{M_{SSA}}{M_{SSW}} = \frac{48.79}{23.48} = 0.02$$

(5) T- Test

$\mu = 105$

$\bar{x} = 125$ $\quad \alpha = 5$

$\sigma = 14$

$n = 25$

$H_0 = \mu = 105$

$H_a = \mu > 105$

$\frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$

$t = \frac{125 - 105}{\frac{14}{\sqrt{25}}}$

$= \frac{20}{\frac{14}{5}} = \frac{20}{2.8} = 7.14$

Degree of freedom = 24

one tailed value = 1.71 → 7.14 does not fall under 1.7.11.

H_a is accepted.

6) Z - test

$\bar{x}$ - Sample mean

μ = population mean

Given ⇒ mean μ = 15 miles.

SD = 14

n Sample = 169

$\bar{x}$ = 16 miles.

$H_0 \rightarrow \mu = 15$ $\quad \alpha = 0.10$

$H_a \rightarrow \mu > 15$

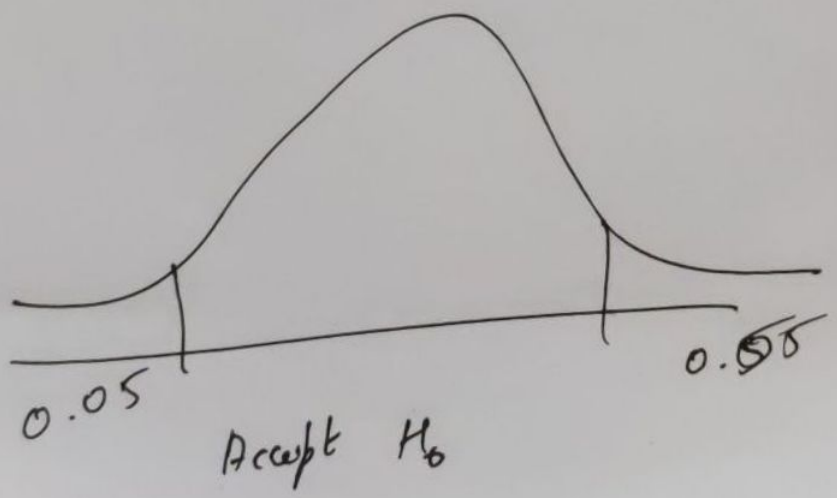
$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} = \frac{16 - 15}{14 / \sqrt{169}}$$

$$Z = \frac{1}{1.07} = 0.93$$

$\alpha = 0.10$

$p(z = -1.39) = 0.823$

$p = 0.823 > 0.10$



Accept H_0

③ F - Distribution.

M1		M2	
20.2	408.04	22.1	488.41
20.9	436.81	21.3	453.69
22.3	497.29	20.1	404.01
22.8	519.84	22.5	506.25
21.5	462.25	20.2	408.04
23.0	529	20.3	412.09
22.4	501.76	20.4	416.16
21.4	457.96	21.1	445.21
21.2	449.44	20.8	432.64
21.3	453.69	20.4	416.16
217	4716.08	209.2	4382.66
Σx	$\Sigma(x)^2$		

$$SSST = \Sigma x^2 - C_x = \frac{9098.74}{} - 9082.32$$

$$S_{SST} = 16.42$$

$$C_x = \frac{\Sigma(x^2)^2}{N} = \frac{(217 + 209.2)^2}{20} = 9082.32$$

$$SS_A = \frac{(\Sigma X^2)}{n} - C_x$$

$$= \frac{(217)^2}{10} + \frac{(209.2)^2}{10} - 9082.3$$

$$= 43.4 \times$$

$$(4708.9 + 4376.46) - 9082.32$$

$$S_{SA} = 3.04$$

$$SS_W = SS_T - SS_A$$

$$= 9082.32 - 3.04 \quad (16.42)$$

$$= 13.38$$

$$M_{SSA} = \frac{SS_A}{k-1} = 3.04$$

$$M_{SSW} = \frac{13.38}{8} = 1.67$$

F- ratio = 1.82

F Table

Mean of machine 1 = 21.7
machine 2 = 20.92
} > 20

Mean of population = 20

$H_0 = 20$ $H_0 = 20$

$H_a \neq 20$ $H_a > 20$

Groups Vs Sample

$2-1=1$ $20-2=18$

$\alpha = 0.05$

Df $\Rightarrow (18, 1)$
df2 df1

F table value = 4.41 (Critical value)

F ratio = 1.82

We accept H_0 as F_ratio is less than 4.41